

## CHAPTER 1 : INTRODUCTION

### 1.1. Introduction

Plants turned out to be more commonly incorporated into medicines in the modern days due to the accumulated knowledge on their benefits over centuries. This information can support the development of modern drugs based on traditional natural remedies (Muthu *et al.*, 2006). Phytochemical compounds are the ones that exert the beneficial effects of the plants. Flavonoids, which can be abundantly found in plants, are a class of plant secondary metabolites which possess a polyphenolic structure (Panche *et al.*, 2016). Flavonoids are usually being utilized due to their anti-inflammatory and antimicrobial properties which can be applied in the pharmaceutical, medicinal, and cosmetics fields. One of the plants that contains flavonoids is tamanu (Arct & Pytkowska, 2008).

*Calophyllum inophyllum* or known as tamanu has been utilized recently since it has several pharmacological properties like antioxidant, anti-inflammatory, and antibacterial (Shanmugapriya *et al.*, 2016). Its oil is commonly implemented in cosmetics due to its ability in treating several types of skin disorders like burns, dermatoses, eczema, acne, psoriasis, and many more. These abilities can be exerted because of the presence of phytochemical compounds, one of them is flavonoids. The major compound that can be obtained from *C. inophyllum* is calophyllolide which has been accounted for its anti-inflammatory, antimicrobial, and anti-cancer properties (Nguyen *et al.*, 2017). Moreover, it could promote wound healing properties since it has anti-inflammatory activity. The utilization of the compounds found in *C. inophyllum* oil in cosmetics can be challenging, therefore the separation and purification of the compounds are necessary to increase the efficiency in the utilization of the compounds (Gunawan *et al.*, 2020).

## **1.2. Objectives**

The purposes of this experiment are to do qualitative analysis to detect the phytochemical compounds present in ethanol-soluble *C. inophyllum* oil, do quantitative analysis to determine the total flavonoid and total phenolic content of ethanol-soluble *C. inophyllum* oil, and do identification on the flavonoids that can be obtained from ethanol-soluble *C. inophyllum* oil.

## **1.3. Scope of Work**

The scope of activities in this study includes the fractionation of *C. inophyllum* oil using absolute ethanol, phytochemical screening, TFC and TPC determination, and identification of flavonoids present in the ethanol-soluble *C. inophyllum* oil utilizing LC-MS/MS.

## **1.4. Hypothesis**

The hypotheses from this study include: some phytochemical compounds in ethanol-soluble *C. inophyllum* oil can be detected through phytochemical screening; the total flavonoid and phenolic content of ethanol-soluble *C. inophyllum* oil can be determined; and a variation of flavonoids in ethanol-soluble *C. inophyllum* oil can be identified.